

## **REMARKS**

Claims 8-19 are pending in this application, claims 1-7 having been cancelled by a telephone interview with the Examiner.

### **Rejections under 35 U.S.C. 112**

Claim 8 and claims depending therefrom stand rejected under 35 U.S.C. 112, second paragraph, as the term “relatively small” is deemed by the Examiner to be indefinite. This rejection is believed to be moot in view of the amendment to claim 8.

Claim 14 stands rejected under 35 U.S.C. 112, second paragraph, as the term “substantially” is deemed by the Examiner to be indefinite.

### **Rejections under 35 U.S.C. 103**

Claims 8 to 19 stand rejected under 35 U.S.C. 103 as being obvious over U.S. Patent 5858813 (“Scherber”) in view of over U.S. Patent 6569349 (“Wang”). Independent claims 8 and 14 are directed to “a method of etching and cleaning a TiW alloy layer.” Applicants respectfully traverse.

In contrast, as the Examiner has correctly pointed out, Scherber discloses a polishing slurry for chemically mechanically polishing (“CMP”) of metal layers, including for example a TiW layer. *See* Scherber, Abstract, and also column 1 lines 5 to 11. As accurately stated in Scherber at column 1, lines 30 to 38, CMP is a process to planarize the surface of the metal layers which involves the concurrent chemical and mechanical polishing of an overlying first layer to expose the surface of a non-planar second layer on which the first layer is formed. The generally accepted mechanism includes chemical oxidation of the metal layer concurrent with abrasion to remove the oxidized portion. *See* Scherber at column 4 line 65 to column 5 line 5. Similarly, Wang is directed to CMP. *See* Wang, Abstract, and at column 2 lines 11 to 14. CMP removes metal to planarize the metal layer and to expose other features disposed under the metal layer.

The Examiner might have been mis-led because paragraphs [0002] to [0021] discuss use of compositions in CMP. Paragraph [0022] relates to etching, and shows the relationship between etching and CMP. However, it is not until paragraphs [0037] to [0039] that etching and residue removal such as are claimed in these pending claims are discussed.


In contrast, independent claims 8 and 14 are directed to a process of cleaning etching residue from a substrate comprising TiW. The Examiner's logic in the first full paragraph in page 4 of the Office Action is wrong. There is no relation between etching and CMP. Etching involves use of highly corrosive material, and is used to form grooves in the substrate. Said grooves in the substrate are cleaned by for example a method such as described in claims 8 and 19, a barrier layer may then be deposited, and the grooves are subsequently filled by adding excess conductive material to the face of the substrate, whereupon CMP is then used to remove excess material and to leave the material disposed in the grooves. Therefore, the process of CMP typically removes the excess of said other materials which were plated on after the etching/cleaning step, where CMP is carried out typically until the underlying substrate is exposed. Etching and cleaning are done before the excess material to be removed by CMP are even added to the substrate. The process recited in independent claims 8 and 14, as is known to those of ordinary skill in the art, does not use an abrasive and does not have a polishing component. This process is not intended to planarize any metal layer, including the TiW layer. Therefore, the use of a composition in this unrelated process step can not make obvious the use of a composition in a method of cleaning etching residue from the substrate.

No fees are believed due at this time; however, if there is any fee due in connection with the filing of this Submission for any reason, please charge the fee to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310.

Respectfully submitted,

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